Tibialis-posterior tendinitis: here's how to avoid tibialis-posterior tendinitis and iliotibial band syndrome

Here's how to avoid tibialis-posterior tendinitis - and look after your iliotibial bands at the same time

Like its 'neighbouring injuries', Achilles tendinitis and plantar fasciitis, tibialis-posterior tendinitis can plague athletes from a variety of different sports (1). The condition is actually an inflammation of the tendon of the important but relatively little-known tibialis-posterior muscle, which originates on the backs of the tibia and fibula in the lower part of the leg and in the membrane which connects these two bones. The tibialis-posterior muscle is a 'deep' sinew which lies underneath the calf's soleus muscle, which itself rests beneath the gastrocnemius, the fleshy portion of the calf. The oft-troubled tendon of the tibialis-posterior muscle passes behind the medial malleolus (the 'knob' on the inside of the ankle) and then inserts on the bottom surfaces of eight key bones which lie just in front of the heel area – the navicular bone, the cuboid bone, the three cuneiform bones, and the second, third, and fourth metatarsals. If you form a mental image of this anatomical positioning, you will realise that a concentric (shortening) action of the tibialis-posterior muscle would plantar-flex your ankle and 'invert' your foot (rotate it inward, with the pivot axis at the ankle joint). The tibialis-posterior muscle and its tendon also provide support for the arch of the foot.

Symptoms to watch for

Although the tibialis-posterior tendon can rupture as a result of sudden impact forces on the foot and ankle (more on this in a moment), the most common cause of tibialis-posterior-tendon problems is overuse, which is another way of saying that the tendon was simply not strong enough to stand up to an athlete's chosen frequency, intensity, and volume of training. Symptoms of tibialis-posterior tendinitis include soreness, pain, and swelling along the inside of the ankle, as well as aching and discomfort along the bottom of the foot. The foot troubled by tibialis-posterior tendinitis is often 'flatter' than the other, problem-free foot (ie, the arch is less concave), and an athlete with tibialis-posterior tendinitis may have a fair amount of difficulty carrying out single-leg heel raises on the affected leg.

Definitive diagnosis of tibialis-posterior tendinitis can be accomplished with an MRI exam (2), by means of ultrasound (3), and even with scintigraphy (4). A high-quality scintigraph will usually reveal elongated, increased uptake of the radioisotope along the anatomical course of the tibialis-posterior tendon in the malleolus region, as well as in the malleolus itself and in the navicular bone.

Unfortunately, a rupture of the tibialis-posterior tendon is a diagnosis which is often missed by regular and sports-medicine doctors, as well as by athletic trainers (5). A rupture should be strongly suspected in athletes who have a pronounced history of ankle-twisting injuries, especially when these injuries have been associated with high-impact loading (landing on the floor after a volleyball spike, hitting the basketball court after a dunk, striking the turf after a leap for the soccer ball, etc.). The tibialis-posterior tendon is especially likely to rupture if such landings are associated with ankle eversion (clockwise motion of the right ankle upon landing or counter-clockwise action at the left ankle joint in conjunction with impact). Ruptures are also linked with more-or-less chronic and generalised pain and swelling along the inside of the ankle. A very flat foot will often be present, and the athlete will have unusual difficulty rattling off a series of one-leg heel raises on the foot with the ruptured tendon.

Suggested therapies

As you might expect, a variety of different therapies have been recommended for the treatment of tibialis-posterior tendinitis. Icing and anti-inflammatory medications are standard remedial agents, and a fairly popular surgical technique – utilised in serious cases of long duration – involves fusing the tibialis-posterior tendon with the nearby flexor-digitorum-longus tendon; the idea here is that the flexor-digitorum-longus tendon will take over some of the function of the tibialis-posterior tendon and relieve stress on the latter structure. Although glowing reports have been published concerning this procedure(6), the research has steadfastly avoided control groups, and the procedure should be utilised only as a last resort, after other therapies have failed.

If you are unfortunate enough to experience tibialis-posterior tendinitis and want to heal yourself and avoid future recurrences of the injury, it is important for you to consider what has actually got you into trouble before you submit to the surgical knife or take a long holiday from your sport while hoping for the best recovery anti-inflammatory medications can provide. If you become thoughtful about your troublesome tibialis tissue, you will come to the perhaps-startling conclusion that the rehabilitative movement which will keep you away from tibialis-posterior injury is the exact movement which has produced your injury in the first place. Remember that tibialis-posterior tendinitis is an overuse injury which begins because your tibialis posterior and its tendon are not strong enough to stand up to the training you are doing. Thus, it is important to strengthen the specific, previously harmful training movement greatly (without inducing further damage), so that your muscles and connective tissues will not be harmed significantly when you begin working out strenuously again.

Why the problem occurs

So what movement hurts – but will ultimately help – your tibialis posterior muscle and its associated tendon? Remember that the tibialis-posterior muscle and its tendon help to plantar-flex your ankle and 'invert' your foot (rotate it inward, with the pivot axis at the ankle joint). These basic, concentric actions are not, however, the ones which cause injury in the tibialis posterior and its tendon as you engage in your athletic activity. The problem occurs when the reverse actions take place, ie, when you evert your foot (rotate it outward, with the pivot axis at the ankle joint) and when you dorsi-flex your ankle. If you are an athlete with normal anatomic structures, these actions occur every time one of your feet hits the ground as you run; the combination of eversion and dorsi-flexion is a key part of an action (along with inward tilting of the foot in a frontal plane) which is often referred to as pronation. The tibialis posterior attempts to control these motions, and in doing so it is stretched as it attempts to contract, placing the muscle and its tendon under very high eccentric strain. That is the damaging action! The greater the extent of eversion and dorsi-flexion, the greater the stress on the tibialis posterior and its tendon. The weaker the tibialis-posterior muscle and its associated tendon, the more inadequately it is able to respond and stay injury-free as pronation is repeated with every footstep.

A pain duet

So, our therapeutic movements for the tibialis-posterior muscle and its tendon will involve eversion and dorsi-flexion of the ankle. If you are a crafty student of biomechanics, you will probably realise that these are the very same motions which place the ilio-tibial band (ITB) along the lateral, upper side of the leg under increased stress, too. In fact, individuals with tibialis-posterior tendinitis often simultaneously suffer from ilio-tibial band (ITB) syndrome, in which the outside of the knee is red-hot, forming a pain duet with the tibialis posterior. The

muscles and tendons in the leg operate as a kinetic chain, and taxing motions in the ankle ('excess' eversion and dorsi-flexion) can produce ripples of stress which pass upward through the leg, inducing damage to the tibialis-posterior tendon and its penthouse relative, the ITB. Of course, the scenario can unfold 'in reverse,' too; that is, a weak ITB can lead to excessive inward movement of the thigh when the foot is on the ground and thus extra pronation at the ankle, which might very well heat up the tibialis-posterior and its tendon.

So, tibialis-posterior problems are often linked with ITB problems in the same leg, and they are also often connected with an increase in shin-muscle strength in the affected leg. The reason for this is that the shin muscles help control the downward acceleration of the foot during running just before the impact between the foot and the ground, and the shin muscles in a leg with tibialis-posterior tendinitis will make an extra effort to control that acceleration in order to take some of the stress of the tibialis posterior and its tendon at footstrike (actually, the shin muscles are pretty stupid, so the nervous system will tutor the shin muscle fibres in the fine art of controlling footstrike, and such tutoring will enhance shin-muscle strength). If you suffer from tibialis-posterior tendinitis, try walking as long as possible on your heels, with your toes pointed straight ahead; usually, the shin muscles in the non-affected leg will become tired first.

Here's a useful routine

Below, you will find a routine which you can use to rehabilitate your tibialis-posterior muscle and tendon after they have been injured – or to prevent tibialis-posterior and ITB problems in the future. The routine will greatly fortify your tibialis posterior and ITB and – pleasantly enough – will make you stronger and more stable when you run and better coordinated when you plant your foot on the ground prior to making a leap when you play basketball, volleyball or soccer. As you will see, all the movements in the routine put a premium on ankle dorsiflexion and eversion, those motions which can damage the tibialis posterior and ITB during training.

The Tibialis-Posterior-Tendon and ITB Fortifying Programme

(1) Warm up with 10 minutes of very light jogging, cycling, elliptical-trainer work, or stair-stepper action.

(2) Walk on your heels, with your ankles dorsi-flexed in an exaggerated way, and with your toes pointed outward (i.e., with your ankles everted). Take coordinated, medium-length steps, and continue until you begin to feel significant fatigue in your ankle area(s); if you have average strength, you should be able to walk in this manner for at least two minutes. Rest for a moment while walking around normally, and repeat. If you feel any pain in your ITB, tibialis-posterior area or arch as you do this drill, discontinue the exercise immediately, and move on to the next one. If you perform the exercise outdoors, be prepared to reply in the negative when passers-by in vehicles ask if you need assistance.

(3) Complete four eccentric knee squats (this exercise simultaneously strengthens the tibialis posterior and ITB, to great effect). Stand facing a wall while maintaining erect posture; your feet should be shoulder-width apart, and your toes should be a few inches from the wall. Bend your legs at the knees, while keeping your upper body upright, so that your knees lightly touch the wall. You may have to adjust the distance from your feet to the wall to accomplish this effectively. Return to your starting position (legs relatively straight, posture erect), and then bend your legs at the knees again, but this time point your knees to the left as you move them toward the wall. You will notice that this produces a nice eversive force around your right heel (a force which must be controlled by the tibialis-posterior muscle and its tendon), which is exactly what happens to your heel when you pronate during the stance phase of running. You are in effect fortifying your tibialis posterior in both a straight-ahead and rotational plane of

motion as you do this. If your right ITB is slightly hot, it will probably begin calling to you as you carry out this move. Return to the starting position, and then bend your legs at the knees one more time, but this time move your knees toward the right, putting a nice eversion force on your left heel. Come back to the starting position, and you have completed one rep.

Repeat this whole sequence three more times, and you are done (for now). If you feel any serious discomfort from your ITB or tibialis-posterior area as you do this exercise, simply stop doing it. Do not worry if your ITB and/or tibialis-posterior areas feel quite uncomfortable during this or any of the exercises. Such pain is simply a sign that you need more recovery before you are ready to do many reps of the exercise, and that is OK. As your tissues heal and get stronger, you will be able to do the drills without trouble. Eventually, you will do this exercise on one leg at a time.

(4) Perform six balance and eccentric reaches with the knee on each leg. Simply stand on your right foot, a little less than an arm's-length from a wall, with your left leg flexed at the knee so that your left shin is roughly parallel to the floor. You should be standing with erect posture, and you may place a finger from each hand on the wall for balance, if necessary. Bring your left knee forwards until it touches the wall – while moving your upper body slightly backward from the hips so that it remains roughly over the right foot. Finish the movement by returning to the starting position. Next, thrust the left knee forwards to the wall again, but this time move the knee somewhat towards the left as you move it forward; again, you may incline your upper body backwards a bit so that it remains over your right foot (you will notice that your right foot pronates as your left knee moves to the left).

Return to the starting position, and then thrust your knee towards the wall while moving it to the right (your right foot will naturally supinate). Finish one rep by going back to the beginning position. Repeat five more times, and then complete the exercise while standing on your left foot, with your right knee moving towards the wall. If it is not necessary to use your fingers on the wall for balance, move your right arm forward as your left knee goes forward – and your left arm ahead as your right knee advances, as would be the case during running. At all times, emphasise good balance and control with the leg in contact with the ground. As you move your knee to the left and right and back to the starting position, you'll notice that your activity is forcing your calf muscles (including your tibialis-posterior muscle) and your ITB to withstand ankle-twisting, rotational forces and side-to-side (frontal-plane) movements, not just straight-ahead pulling. That is exactly what you want, because improved strength in all appropriate planes of movement will help your tibialis-posterior muscles and ITBs and make you a more stable, injury-resistant runner.

(5) Complete five dynamic tibialis-posterior exercises on each foot. Begin by facing that familiar wall, about an arm's-length away, with your weight supported on your right foot, your right knee slightly flexed (as it would be during the stance phase of running), your left leg imitating the swing phase of the gait cycle (with your left thigh up and almost parallel with the floor), and your hands against the wall for support. Then, simply rock forward towards the wall, so that you feel a nice stretch in your lower calf area. Without pausing, lean slowly toward the left, so that your right Achilles tendon, right tibialis-posterior muscle and tendon, and right calf are being pulled in a lateral-left direction. Your right foot should be in a pronated position, as it is during the initial portion of the stance phase of the gait cycle. Then, as part of a pattern of continuous motion, lean toward the right, crossing your left leg over your right leg, so that your right Achilles and calf are being pulled in a lateral-right direction. Your right foot should now be in a supinated position, as it is just prior to toe-off during the gait cycle. Without stopping, rock back to your starting position and repeat this overall motion four more times, before shifting over to your left foot for the same number of reps.

Speeding up

For now, use slow speeds of movement, relatively small ranges of motion, and low resistance (just your body weight) for exercises three through five. Once you are comfortable with doing the exercises, you will be able to incorporate greater speeds, larger ranges of motion at the knees and ankles, heavier resistances (starting with very light dumbbells held in your hands and moving up to heavier bells), more repetitions (starting with seven to 10 and gradually moving up to 20 to 30), and less outside stability (not placing your fingers or hands on the wall). You will also perform the eccentric knee squats on one leg at a time, instead of two. The overall idea is to progress in difficulty as you progress in strength and coordination.

(6) The tibialis-posterior muscle and tendon also provide support for the arch, so exercises which strengthen the arch will take some of the heavy load off the tibialis posterior and its tendon. To this end, complete two sets of 60 toe grasps with each foot. Stand barefoot with your feet hip-width apart. In an alternating pattern, curl the toes of your right foot and then your left foot down and under, as though you were grasping something with the toes of each foot. Repeat this action (right foot, left foot, right foot, etc.) for a total of 60 repetitions on each foot. Rest for a moment, and then repeat one more set. Try pulling yourself across the floor (smooth surfaces work best) for a distance of four to six feet as you become more skilled at this exercise.

(7) Complete five reps of the ITB exercise. Simply stand on one foot near the lateral edge of a short bench, curb, or step, using the foot of your involved leg (the one with the ITB problem). You may hold onto a railing or wall with the opposite hand (the one on the other side of your body from the involved leg), if necessary. Your legs should be fairly straight. With both knees locked, lower the opposite, non-involved foot and hip toward the floor or ground. As you do so, of course, your involved hip will move upward somewhat, so that it is actually higher than the non-involved hip, which is moving downward along with the non-involved leg. Your involved hip will also move slightly in a lateral direction, in addition to moving up. This swivel-hip action is crucial to this exercise – and in fact represents exactly what happens to your hips during the stance phase of the gait cycle.

As you drop your non-involved leg and let your involved hip move upward and laterally, attempt to shift most of your body weight to the inside part of the foot of the involved leg. This simulates the natural pronation of the foot which occurs during stance, and it also engages and puts tension on your ITB, exactly as it does when you run across the athletic field. Make sure that a fair amount of your body weight is directed through your heel and mid-foot area, not just your toes.

A bowl full of cream

Now here's the crucial part of the exercise: bend your weight-supporting, involved knee slightly (about 10 to 20 degrees), but keep your non-involved foot off the ground or floor. Next, move the involved hip forward about four to six inches, while keeping the involved heel in contact with the step, kerb, or bench and your weight on the inside of your involved foot. As you do this, all of the action should be at your hip! Your knee angle should stay about the same throughout the exercise (don't try to rock forward at the knee – do all the forward motion from the hip). If you think of your pelvic girdle as a bowl full of cream, that bowl is rocking backward (the bottom of the bowl is coming up and toward the front as the top of the bowl goes back slightly). As your involved hip moves forward, your upper body should move backward. As your involved hip moves forward, make sure that it stays in a lateral position, and make sure that your involved hip is still higher than your non-involved hip.

After you have moved your hip forwards, move it straight backwards, making sure it goes back four to six inches beyond the straight-up, starting position (thus, the total hip-movement distance in this exercise is around eight to 12 inches – four to six inches toward the front and four to six inches toward the back, in relation to the straight-up torso position). As your hip moves backward, your upper body will tend to bend forward.

This action may seem strange to you, especially when you realise that in effect your hip is swinging back and forth over your foot in two different planes of motion – front to back (the sagittal plane) and also sideways (the frontal plane). Most athletes envision the biomechanics of running quite differently and tend to think that the key action during running is the swinging of the foot back and forth around the 'anchor point' of the hip. However, the truth is that when the foot is on the ground, the foot is the anchor point, and the hip essentially rotates around the foot, not vice-versa. It's this hip action which can put mega stress on your ITB.

Feel the burn

As you do the ITB exercise, you should feel the burn – or if not the burn at least some pretty heavy-duty pulling and stress along the side of your leg. If you don't feel anything happening, go back to the basic position and try again, making sure that your involved hip ends up in a lateral position and is higher than the other hip – and also making sure that your weight is shifted to the inside of the involved foot. As your weight shifts to the inside of the foot and your hip moves laterally, your thigh is adducted, exactly as it is when you run across the athletic field, and your iliotibial band must work hard to control this adduction as your hip moves back and forth. To ensure that your involved leg does not get much stronger than your non-affected leg, don't forget to also carry out the exercise on your non-involved leg, too.

Once you have completed the routine, continue on with the rest of the workout which you have planned for the day. It is advisable to complete the routine two to three times a week. At first, this probably will probably seem a nuisance – time-consuming and a bit difficult to carry out. However, once you learn the exercises you will reel them off quickly, and you will be amazed by how much they help your tibialis-posterior muscle and ITB, as well as your overall leg strength and coordination. You will be much more resistant to injury, and you should be a quicker and more efficient athlete, too.

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